

New Species of Panamic Gastropods

BY

JAMES H. McLEAN

Los Angeles County Museum of Natural History
900 Exposition Boulevard, Los Angeles, California 90007

(Plate 46)

DURING RECENT YEARS collecting of mollusks in the Panamic Province has greatly increased, due chiefly to the interest generated by the appearance in 1958 of "Seashells of Tropical West America" by Dr. Myra Keen. Now that this book will soon appear in a revised edition, I offer descriptions of the following new species. Several of the species are part of the Allan Hancock Foundation collection now on loan to the Los Angeles County Museum of Natural History, several have resulted from field work of the Museum, while others result from the recent collecting in the Galápagos Islands by André and Jacqueline DeRoy, of Isla Santa Cruz, Galápagos Islands.

Repositories of type material for species described here-in include the following institutions:

- AHF – Allan Hancock Foundation (on loan to LACM)
- AMNH – American Museum of Natural History, New York
- CAS – California Academy of Sciences, San Francisco
- LACM – Los Angeles County Museum of Natural History
- SDNHM – San Diego Natural History Museum
- SU – Stanford University, Stanford, California
- USNM – United States National Museum, Washington, D. C.

Arene guttata McLEAN, spec. nov.

(Plate 46, Figures 1, 2)

Description of Holotype: Shell small for the genus, solid, umbilicate, turbinate, suture deeply channeled; nuclear whorls $1\frac{1}{2}$, smooth, rounded, the nuclear tip not raised; postnuclear whorls $3\frac{1}{2}$. Spiral sculpture on the early whorls consisting of 3 carinations that gradually take shape on emerging from the undelimited nuclear whorls. On the body whorl the peripheral carination projects

slightly; this is the 3rd of the early spiral cords, above are 2 strongly beaded cords, between which arises a less prominent beaded cord, developed only on the final whorl; below the peripheral cord another strong cord projects almost as far. The suture is laid above this cord until the 3rd whorl, at which point the suture exposes it; the base of the cord is not exposed by the suture except at the upper edge of the mature lip. Base with 6 prominent beaded cords, 2 of which enter the umbilicus. Axial sculpture of fine lamellae over entire surface, beading on the spiral cords produced by the thickening and overlapping of 5 to 8 layers of lamellae in the direction of growth. Aperture circular, nacreous within, a trace of denticles within the outer lip. Lip thickened, spiral cords reflected inward at lip, when seen in basal view. Color whitish, with random dotting of pink on the spiral cords. Operculum multispiral, concave, of about 10 whorls, beaded in a radiating pattern. Height, 4.5 mm, diameter, 5.0 mm.

Type Material: Holotype, LACM 1275; 50 paratypes, LACM 1276; 3 paratypes, AMNH 154685; 3 paratypes, CAS 13273; 3 paratypes, SDNHM 51302; 3 paratypes, SU 9986; 3 paratypes, USNM 679554.

Additional paratypes are available for distribution to other institutions.

Type Locality: Academy Bay, Santa Cruz Island, Galápagos Islands, Ecuador, 0°45' S, 90°20' W, in tidal pool under rocks. The type lot, consisting of 119 specimens, was collected by Jacqueline DeRoy, 30 May, 1969.

Referred Material: AHF bottom sample 432, Tagus Cove, Albemarle (Isabela) Island, 80 - 100 fathoms, 1 dead specimen, probably of shallow water origin. Although the species is evidently abundant at the type locality, its absence in collections made at shore stations by the Hancock Expeditions suggests that its distribution in the Galápagos Islands is highly localized.

Discussion: *Arene guttata* is evidently one of the species of *Arene* having a consistent color pattern and on this distinction alone may be separated from other eastern Pacific and western Atlantic species known to me. In addition, other eastern Pacific species having the rounded periphery are considerably larger and have more numerous spiral cords.

The name is taken from the Latin, *guttatus*, spotted, with reference to its spotted color pattern of pink dots.

Arene echinata McLEAN, spec. nov.

(Plate 46, Figures 3, 4)

Description of Holotype: Shell large for the genus, sturdy but not massive, rounded-turbinate, umbilicate, suture deeply channeled. Nucleus of 1 whorl, postnuclear whorls 5, spiral sculpture on the early whorls consisting of 3 strong cords with sharply projecting scales. A 4th strong spiral cord emerges above the suture on the penultimate whorl and 2 secondary cords emerge in the channels adjacent to the middle primary cord. On the last whorl just behind the lip all cords are of nearly the same size and counting from the suture to umbilicus there are 12 cords, including 2 that spiral deep within the umbilicus. Axial sculpture of fine growth lamellae, about 7 layers occur between each 2 projecting scales on the spiral cords. Aperture circular, nacreous within, outer lip having weak denticles within. Lip mature but not thickened, abruptly dipping downward at the suture. Color pinkish brown, with irregular lighter mottling. Operculum unknown. Height, 8.5 mm, diameter, 8.0 mm.

Type Material: Holotype, AMNH 154626; 1 paratype, AMNH 154627; 2 paratypes, LACM 1277.

Type Locality: Espinosa Point, Fernandina Island, Galápagos Islands, Ecuador, 0°16' S, 91°27' W. The type lot of 4 specimens (hermit crab shells) was collected at low tide by Jacqueline DeRoy, 30 January 1968. Two specimens were originally forwarded to Dr. William K. Emerson of the American Museum of Natural History, who kindly granted me permission to describe the species; 2 additional specimens from the same lot were later received from Mrs. DeRoy.

Referred Material: AHF bottom sample station 418, Darwin Bay, Tower Island, Galápagos, 17 fathoms, 1 dead specimen. In addition, dead juvenile specimens are represented from AHF bottom sample stations in the Galápagos Islands as follows: 438, San Cristobal (Chatham); 441, San Salvador (James); and 452, Santa María (Charles), at depths ranging from 24 - 65 fathoms.

Discussion: *Arene echinata*, another species endemic to the Galápagos Islands as far as is known, is the largest eastern Pacific species of the genus. In this species the usual beaded sculpture of *Arene* is spinose to a greater extent than observed in other species. Mature specimens may live offshore or may eventually prove to be living at low tide.

The name is taken from the Latin, *echinatus*, spiny, prickly, with reference to the characteristic sculpture.

Vermicularia frisebeyae McLEAN, spec. nov.

(Plate 46, Figures 5, 6)

Description of Holotype (*Turritella*-stage): Whorls 12, overall slope of shell slightly convex on the sides, nuclear tip lost, first remaining whorl sculptured by 2 strong raised keels that are equally spaced between the sutures; by the 9th whorl the posterior of the 2 keels is diminished in size and prominence; fine spiral threading appears at about the 10th whorl and the posterior of the 2 keels is barely perceptible, the lowermost or peripheral keel remains strong at about $\frac{1}{3}$ the distance from the anterior suture. The base is defined by a strongly projecting keel, the summit of which is left exposed by the growing edge of the lip; base nearly flat, sculptured with fine spiral striae; lip thin (broken on holotype), its growth line trace slanting backward, forming a broad sinus slightly above the main carination; inner lip thin, reflected across a narrow umbilicus. Color whitish with brown maculations along the lines of growth on the body whorl and base. Height, 26.8 mm, diameter, 10.8 mm.

Description of Adult Stage: Shell having 3 whorls with relaxed coil beyond the *Turritella*-stage; the first of these whorls in an open spiral, the last 2 with the axis of coiling at a 45° angle. The basal and the peripheral keels remain strong and there are 5 less prominent spiral cords on the outermost side of the whorl; all surfaces bear fine spiral striae. Height, 61.2 mm, maximum diameter of aperture, 11.0 mm.

Type Material: Holotype, LACM 1278; 1 paratype, LACM 1279 (poor condition); 1 paratype, USNM 679555; 1 paratype, SU 9988; 2 paratypes, Frisbey collection (1 in poor condition).

Type Locality: Off the lighthouse, Manzanillo, Colima, Mexico, 19°03' N, 104°20' W, 30 - 40 fathoms. The type lot, consisting of 6 specimens (*Turritella*-stage), was dredged by Mrs. Jeanne Frisbey of Port Isabel, Texas, February, 1969.

Referred Material: AHF 274-34, Tenacatita Bay, Jalisco, Mexico, 50 fathoms, 2 specimens (*Turritella*-stage); AHF 863-38, Bahía Honda, Panama, 30-50 fathoms, 1 specimen (*Turritella*-stage); 4 lots, Donald Shasky collection, Redlands, California: Gulf of Tehuantepec, Mexico, 45 fathoms, 4 specimens (*Turritella*-stage); La Libertad, El Salvador, 18 fathoms, 1 specimen (*Turritella*-stage); Gulf of Fonseca, El Salvador, 38-60 fathoms, 1 specimen (1 free whorl); El Salvador, exact locality unknown, 1 specimen (3 free whorls, described above). Specimens of the adult stage were examined after the plate had been prepared, too late for illustration in this paper.

Discussion: *Vermicularia frisbeyae* has a wide distribution in the Panamic province. It has escaped detection until now evidently because it lives at depths less frequently collected by dredging.

The only eastern Pacific or western Atlantic species of *Vermicularia* having the large *Turritella*-stage is *V. fargoii* OLSSON, 1951, from the Gulf of Mexico, which occurs at low tide on mud-flats. *Vermicularia fargoii* is a variable species but generally has 3 prominent spiral cords per whorl rather than 2 as in *V. frisbeyae*.

Turritella willetti McLEAN, spec. nov.

(Plate 46, Figures 7, 8)

"*Turritella sanguinea* REEVE, 1849." —SHASKY, 1961, p. 23; plt. 4, fig. 15.

Description of Holotype: Shell moderately large, tapering, whorls 21, with thin periostracal remnants, nuclear

whorls lost; earliest whorls highly convex with deep sutures, under magnification the spiral sculpture on about the 6th whorl consisting of about 16 narrow, raised threads with slightly broader interspaces; at about the 9th whorl 5 of the threads become more prominent and the area below the 3rd thread from the base bevels in toward the suture, the cording above tending to become flat sided, rather than convex as in the early whorls. On the penultimate whorl 5 strong cords remain, the general effect is of flat sided whorls, beveling in above and below the suture. The base is rounded and there are faintly indicated spiral cords. Aperture nearly circular, lip thin; growth-line trace slanting backwards, forming a broad, shallow sinus close to the anterior suture. Color whitish with brown maculations, stronger cords with alternating light and dark markings. Height, 73.0 mm, diameter, 13.7 mm.

Type Material: Holotype, LACM 1280; 2 paratypes, LA CM 1281; 1 paratype, AMNH 154686; 1 paratype, CAS 13274; 1 paratype, SDNHM 51303; 1 paratype, SU 9989, 1 paratype, USNM 679556. Additional paratypes are in the Shy collection.

Type Locality: Santiago Bay, Manzanillo, Colima, Mexico, 19°06' N, 104°23' W, 7-12 fathoms. The type lot was dredged by Laura and Carl Shy of Westminster, California, November and December, 1968.

Referred Material: AHF 1087-40, Ensenada de San Francisco, Sonora, 15-18 fathoms; AHF 947-39, Isabel Island, Mexico, 15-25 fathoms; LACM A.375, Chamela Bay, Jalisco, Mexico, 15-40 fathoms; LACM A.375, Tenacatita Bay, Jalisco, 20-40 fathoms; LACM A.375, Zihu-

Explanation of Plate 46

Figures 1, 2: *Arene guttata* McLEAN, spec. nov. Holotype, LACM 1275. Santa Cruz Island, Galápagos Islands. Height 4.5 mm, diameter 5.0 mm × 6

Figures 3, 4: *Arene echinata* McLEAN, spec. nov. Holotype, AMNH 154626. Fernandina Island, Galápagos Islands. Height 8.5 mm, diameter 8.0 mm × 4

Figure 5: *Vermicularia frisbeyae* McLEAN, spec. nov. Holotype, LACM 1278. Manzanillo, Mexico. Height 26.8 mm, diameter 10.8 mm × 1.5

Figure 6: *Vermicularia frisbeyae*, holotype, detail of early whorls × 3

Figure 7: *Turritella willetti* McLEAN, spec. nov. Holotype, LACM 1280. Manzanillo, Mexico. Height 73 mm, diameter 13.7 mm × 1

Figure 8: *Turritella willetti*, holotype, detail of early whorls × 3

Figure 9: *Natica brunneolinea* McLEAN, spec. nov. Holotype, LA CM 1282. Santa Cruz Island, Galápagos Islands. Height 10.8 mm, diameter 10.5 mm × 3

Figure 10: *Natica brunneolinea*. Paratype, LACM 1283. Height 45.8 mm, diameter 42.3 mm × 1

Figure 11: *Natica sigillata* McLEAN, spec. nov. Holotype, LACM 1284. Isabella Island, Galápagos Islands. Height 10.0 mm, diameter 10.5 mm × 3

Figure 12: *Natica sigillata*. SU 49428. Carmen Island, Mexico. Height 19.5 mm, diameter 19.2 mm × 2

Figure 13: *Cantharus (Gemophos) berryi* McLEAN, spec. nov. Holotype, LACM 1286. Banderas Bay, Mexico. Height 21.1 mm, diameter 11.7 mm × 1.5

Figure 14: *Cantharus (Gemophos) berryi*. Paratype, LACM 1286. Showing egg capsules attached to the shell. Height 20.8 mm, diameter 12.7 mm × 1.5

Figure 15: *Fusinus allyni* McLEAN, spec. nov. Holotype, LACM-AHF 1290. Daphne Minor Island, Galápagos Islands. Height 88.4 mm, diameter 34.2 mm × 1

Figure 16: *Fusinus allyni*. Paratype, LACM-AHF 1291. Height 70.6 mm, diameter 34.6 mm × 1

Figure 17: *Fusinus allyni*. Paratype, LACM-AHF 1291. Height 40.0 mm, diameter 14.3 mm × 1.5



Figure 1

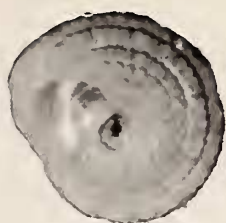


Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8

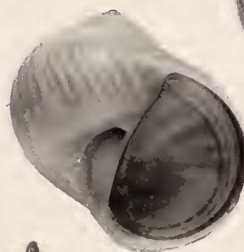


Figure 9



Figure 10



Figure 11



Figure 12



Figure 15



Figure 17



Figure 13



Figure 14



Figure 16



atanejo, Guerrero, Mexico, 20-40 fathoms. The last 3 lots were dredged by the late George Willett in 1938.

Discussion: *Turritella willetti* is a species familiar to collectors having dredged along the Mexican coast. SHASKY (1961) attempted to equate the species with REEVE's *Turritella sanguinea* (REEVE, 1849, p. 6, fig. 27), which was said to be from "California." In REEVE's illustration the final whorls are also convex and other details of sculpture and color pattern do not correspond. REEVE's taxon is most likely not West American.

Turritella willetti, with its strongly convex early whorls, cannot be confused with other eastern Pacific species, all of which have fewer spiral cords on the early whorls. The cording of the mature whorls is variable and is similar to the pattern observed in *T. mariana* DALL, 1908. The largest specimen observed measures 81 mm in length.

Turritella willetti is named for the late George Willett of the Los Angeles County Museum of Natural History, first person to collect specimens of the material at hand. Willett's collecting in Mexico in 1938 greatly enriched the Museum's collections.

Natica brunneolinea McLEAN, spec. nov.

(Plate 46, Figures 9, 10)

Description of Holotype: Shell thin, umbilicate, spire low, whorls rounded, surface of final whorl with thin yellowish periostracum. Nuclear whorls 3, glossy, first nuclear whorl dark brown; postnuclear whorls $2\frac{1}{2}$, sculptured with fine retractive axial grooves strongest just below the suture and extending only halfway to the periphery. Outer lip thin, umbilicus narrow, partially obstructed within by thick spiral ridge terminating on the inner lip; parietal callus extending slightly forward near the umbilicus. Color yellowish on upper portion of whorl, base below the periphery whitish, marked with irregular brown pencilled lines on the peripheral area only. Operculum calcareous, white, with 2 deep grooves at the outer edge. Height, 10.8 mm, diameter, 10.5 mm.

The largest paratype (LACM), which lacks the operculum, has 4 postnuclear whorls and measures: height, 45.8 mm, diameter, 42.3 mm.

Type Material: Holotype, LACM 1282; 1 paratype, LACM 1283; 1 paratype, SDNHM 51304; 1 paratype, USNM 679557; 1 paratype, AMNH 154687.

Type Locality: Academy Bay, Santa Cruz Island, Galápagos Islands, Ecuador, $0^{\circ}45'S$, $90^{\circ}20'W$, 50-100 fathoms, dredged by André and Jacqueline DeRoy, 26 April 1967 (3 specimens), 27 May 1968 (1 specimen), 9 December 1968 (1 specimen).

Referred Material: Galápagos Islands, Ecuador: AHF 190-34, S end Albemarle Island, 58-60 fathoms, 3 specimens; AHF 810-38, Barrington Island, 48-73 fathoms, 2 specimens; AHF 814-38, N of Hood Island, 20-40 fathoms, 3 specimens; AHF 816-38, N of Hood Island, 50-100 fathoms, 1 specimen with operculum; AHF 817-38, N of Hood Island, 140-160 fathoms, 1 specimen.

Discussion: *Natica brunneolinea* reaches a large size; the paratype measuring 45.8 mm in height is larger than specimens of other Panamic species examined. It is the only eastern Pacific species having the color pattern of vertical brown lines on the upper part of the whorl, hence the name. The doubly grooved operculum is known in *Natica grayi* PHILIPPI, 1852, and *N. scethra* DALL, 1908, but these species are smaller and have spiral rather than axial color patterns.

Natica sigillata McLEAN, spec. nov.

(Plate 46, Figures 11, 12)

Description of Holotype: Shell globose, narrowly umbilicate, spire low, whorls rounded, surface of final whorl with thin yellowish periostracum. Nuclear whorls $1\frac{1}{2}$, glossy, yellow brown; postnuclear whorls $3\frac{1}{2}$, smooth except for fine lines of growth. Outer lip thin, umbilicus narrow, columellar wall not greatly thickened, spiral umbilical cord lacking, a short tongue of white callus extends slightly across the whorl, but not obstructing the umbilicus; parietal callus between this tongue and the upper edge of the lip not developed, resulting in an uncalloused band on the parietal wall extending within the aperture. Color chestnut brown with tent shaped markings of white, area immediately adjacent to umbilicus white. Operculum calcareous, white, with 4 raised ridges at the outer edge, the 2 inner ridges broader than the outer 2. Height, 10.0 mm, diameter, 10.5 mm.

The largest paratype (LACM 1285), which lacks the operculum, measures: height, 14.9 mm, diameter, 13.3 mm.

Type Material: Holotype, LACM 1284; 1 paratype, LACM 1285; 1 paratype, SDNHM 51305; 1 paratype, USNM 679558; 1 paratype, AMNH 154688.

Type Locality: Tagus Cove, Isabella Island, Galápagos Islands, Ecuador, $0^{\circ}16'S$, $91^{\circ}22'W$, 50 fathoms, 4 specimens, dredged by André and Jacqueline DeRoy, 25 and 29 January 1968. The LACM paratype was dredged at South Academy Bay, Santa Cruz Island, by the DeRois, 11 June 1968.

Referred Material: SU 49428, between Carmen Island and Loreto, Baja California, 20-45 fathoms, Ariel Expedi-